

SOME QUESTIONS FOR ARCHÆOLOGISTS.

THE study of a few of our British stone monuments from an astronomical point of view has led me to the conclusion that if such an inquiry be continued information will ultimately be obtained touching the order of succession of the various swarms of immigrants who set out the various systems of alignments. Approximate dates of the changes of temple worship representing different cults, and, therefore, possibly different tribes, have already been obtained, for I have evidence that the risings of stars, as well as of the sun, were observed in some of the circles. I also believe that much folklore and many myths may find their explanation.

I begin with the fact that some circles used in the worship of the May year were in operation 2000 B.C., and there was a change of cult about 1600 B.C., or shortly afterwards, in southern Britain, so definite that the changes in the chief orientation lines in the stone circles can be traced.

To the worship of the sun in May, August, November, and February was added a solstitial worship in June and December.

The easiest explanation is the advent of a new swarm of immigrants about that date.

The associated phenomena are that the May–November Balder and Beltaine people made much of the rowan and maythorn. The June–December people brought the worship of the mistletoe.

The flowering of the rowan and thorn tree in May, and their berries in early November, made them the most appropriate and striking floral accompaniments of the May and November worships, and the same ideas would point to a similar use of the mistletoe in June and December.

Another associated phenomenon is that chambered barrows seem sometimes to have been used by the solstitial people instead of, or in addition to, stones to mark sight-lines.

If there were such swarms, and the June–December succeeded and largely replaced the May–November one, this could hardly have been put in a cryptic and poetic statement more happily than it appears in folklore: Balder was killed by mistletoe.

In the May–November circles and alignments we deal with unhewn stones. In the June–December alignments the stones in Brittany are tooled.

In this we have a strong argument in favour of the same order of succession.

The Worship Conditions and a Working Hypothesis.

In a colony of the astronomer-priests who built and used the ancient temples we had of necessity:—

(1) Observatories, *i.e.* circles, alignments, coves or holed stones, for viewing the alignments or sight-lines.

A study of the sight-lines shows us that the stones—collimation marks—were of set purposes, placed some distance away from the circles, so far that they would be required to be illuminated in some way for the dawn observations. When there was no wind, one or more hollows in a stone, whether a menhir or a quoit, might have held oil or grease to feed a wick. But in a wind some shelter would be necessary, and the light might have been used in a cromlech or allée couverte. Stones have been found with such cups, and débris of fires have been found in cromlechs.

(2) Dwellings, which would be cromlechs or many-chambered barrows, according to the number of astronomer-priests at the station, and possibly some arrangement for protecting a sacred fire.

(3) A water supply for drinking and bathing, which might be a spring, river or lake, according to the locality.

Assuming this, I ask whether we may not consider the following working hypothesis, the accuracy of which can be easily tested by those conversant with these subjects, which I am not; nor have I time to look over the vast and scattered literature where the facts are recorded.

Everything relating to these three different classes of things was regarded as very holy, because they were closely associated with the astronomer-priests, on whom the early

peoples depended for guidance in all things, not only of economic, but of religious, medical and superstitious value.

Hence the circles, mounds and alignments, as sacred places, were subsequently used for burials, as Westminster Abbey has been; but burials were not the object of their erection by the first swarms.¹ I believe they were afterwards used for burials by later swarms, who imitated them, and built round barrows without living chambers for the dead.

The perforated stones were regarded as sacred, so that marriages took place at them, and passing through them was supposed to cure disease. Whether men and women, or children only, passed through the hole depended upon its size. But a hole large enough for a head to be inserted was good for head complaints. I may state that I have traced holed stones on May–November alignments. In too many cases the temples connected with them have been so ruthlessly destroyed that their use cannot so easily be established.

The cups for the light would also become sacred objects; have not many of them since been used for holy water?

The wells, rivers, and lakes used by the priests were, as holy places, invested with curative properties, and offerings of garments (skins?), and pins to fasten them on, were made at them to the priests, as well as bread and wine and cheese.

The fact that the tree on which the garment was hung was either a rowan or a thorn shows that these offerings commenced as early as the May–November worship.

These wells are in many cases alongside cromlechs, circles or unhewn stones. In others they are near churches which have been built upon the sites of the more ancient temples.

At the coming of the June–December people all the old practices and superstitions were retained, only the time of year at which they took place was changed. As the change of cult was slow, in any one locality the celebrations would be continued at both times of the year.

The June–December people did what they could to favour their own cult by changing the old holidays, with the result that for long both sets of holidays were retained.

Since I have shown that the solstitial worship came last, as a rule traces of this would be most obvious in places where it eventually prevailed over the cult of the May year. In such places the absence of traces of the May festival would afford no valid argument against its former prevalence. In other places, like Scotland, where the solstitial cult was apparently introduced late and was never prevalent, we should expect strong traces of the May worship, and, as a matter of fact, it is very evident in the folk-lore and customs of Scotland.

The Conditions of Migration.

May we suppose that any of the races reached Britain by sea?

Some facts with regard to ancient travel are the following. Our start-point may be that Gudea, a Babylonian king who reigned about 2500 B.C., brought stones from Melukhkha and Makan, that is, Egypt and Sinai (Budge, "History of Egypt," ii., 130). Now these stones were taken coastwise from Sinai to Eridu, at the head of the Persian Gulf, a distance of 4000 miles, and it is also said that then, or even before then, there was a coastwise traffic to Malabar, where teak was got to be used in house-building. The distance from Eridu coastwise to Malabar, say the present Cannanore, is 2400 miles.

The distance, coastwise, from Alexandria to Sandwich, where we learn that Phœnicians and others shipped the tin extracted from the mines in Cornwall, is only 5300 miles, so that a voyage of this length was quite within the powers of the compassless navigators of 2500 B.C.

The old idea that the ancient merchants could make a course from Ushant to, say, Falmouth or Penzance need no longer be entertained; the crossing from Africa to Gibraltar and from Cape Grisnez to Sandwich were both to visible land, *i.e.* coastwise. The cliffs on the opposite land are easily seen on a clear day.

Hence it would have been easier before the days of astronomical knowledge and compasses to have reached

¹ "Les Celtes et les Gaulois dans les Vallées du Pô et du Danube," p. 82.

England, and therefore Ireland and the Orkneys, than to get to some of the islands in the Mediterranean itself; and the prevalence of solstitial customs in Sardinia and Corsica, with apparently no trace of the May year, tends to support this view, which is also strengthened by the fact that the solstitial customs in Morocco are very similar to those we read of in Britain.¹ The May year is unnoticed, and there is a second feast at Easter (March 16).

The May Year.

I traced the May year in Egypt at Thebes, the temple being that of Min, and the possible date 3200 B.C. Mr. Penrose showed that the Hecatompedon and the Archaic temple of Minerva at Athens were May temples, the dates of the foundations being 1495 B.C. and 2020 B.C. respectively; but the cult must have been there before the foundations; and the cult may well have come from Thebes, and I fancy it must have been all over the known world at the time. The warning stars at Athens were the Pleiades for temples facing the east, and Antares for temples using the western horizon.

But the equinoctial pyramid- and Babylonian-cult in vogue in Egypt in the early dynasties (4000 B.C.), with the warning stars Aldebaran (March) and Vega (September), was also represented in Greece at a much later period.

In Egypt generally, the solstitial worship followed that of the May and equinoctial years. The religion of Thothmes III. and the Rameses was in greatest vogue 2200-1500 B.C.

We find little trace of it in Greece proper, though Mr. Penrose has traced it in Calabria and Pompeii, and in some of the islands.

Because in the first glimpse of the May year we have dates from 3200 B.C. at Thebes, it does not follow that it did not reach Athens before 2000 B.C., because Mr. Penrose found a temple of that date. It is clear, also, that with the possibilities of coastwise traffic as we have found it, it might have easily reached Ireland by then; 2000 B.C., therefore, is a probable date for the May worship to have reached Britain, arguing on general principles; we now know as a matter of fact that it really reached Britain earlier.

May we assume, then, a traffic transferring even astronomer priests from Egypt to Britain at that date?

But why not Greece to Britain? Because by that time, as we learn from Mr. Penrose, the equinoctial worship from Babylonia had reached Greece as well as the May year from Egypt, and traffic from Greece would have brought both, but the equinoctial cult did not reach us then; there is no trace of Easter worship in the earliest stone circles.

The solstitial cult was born in Egypt; it is a child of the Nile-rise. I have shown in my "Dawn of Astronomy" that the long series of temples connected with the solstice may have commenced about 3000 B.C.; but for long it was a secondary cult; it was parochial until the twelfth dynasty, say 2300 B.C., Egypt's solstitial "golden age" may be given as 1700 B.C., and her influence abroad was very great, so that much travel, "coastwise" and other, may be anticipated. It is for some centuries after the first date that the introduction of the solstitial worship into Britain may be anticipated. It, for instance, is quite probable that the pioneers of sun worship should have reached Stonehenge in 2000 B.C., but the solstitial worship can only be proved after 1680 B.C.

A paper by Prof. J. Morris Jones on "Pre-Aryan Syntax in Insular Celtic" appears in the "Welsh People," by Rhys and Brynmor-Jones (Fisher Unwin), pp. 617-641. Prof. Jones was led to make the comparisons contained in it by the theory that the long-headed early inhabitants of Britain had migrated into Britain from North Africa. He finds that the syntax of Welsh and Irish differs from that of other Aryan languages in many important respects, e.g. the verb is put first in every simple sentence. Prof. Rhys had suggested that these differences represented the persistence in Welsh and Irish of the syntax of a pre-Aryan dialect, and as the anthropologists hold that the pre-Aryan population of these islands came from North Africa, it seemed to Prof. Jones that that was the obvious place to

look for the origin of these syntactical peculiarities. He finds the similarities between Old Egyptian and neo-Celtic syntax to be astonishing; he shows that practically all the peculiarities of Welsh and Irish syntax are found in the Hamitic languages.

This conclusion practically implies that the bulk of the population of these islands, before the arrival of the Celts, spoke dialects allied to those of North Africa. The syntactical peculiarities must have represented the habits of thought of the people, which survived in the Celtic vocabulary imposed upon them.

These conclusions were not known to me when I began to see the necessity of separating the cult of the June from that of the May years, and the identity of the conclusions drawn from astronomical and linguistic data is to me very striking, and also suggests further special inquiries.

The temple conditions in Greece investigated by Mr. Penrose, and on which the above generalisation is based, may be tabulated as follows:—

May Year.

		Dec.	Day	Year
				B.C.
Archaic temple of Minerva	Pleiades	+ 7 50	April 20	2020
Hiero of Epidaurus, Asclepieion	"	+ 9 15	" 28	1275
Hecatompedon	"	+ 9 58	" 26	1150
Older Erechtheum	Antares (setting)	- 14 31	" 29	1070
Temple of Bacchus	Pleiades	+ 10 35	" 29	1030
Corinth	Antares (setting)	- 16 0	May 6	770
Aegina	"	- 16 45	" 7	630

Solstitial Year.

June				
Athens. Dionysus (Upper Temple)	Antares (setting)	- 11 2	June 20	1700
Pompeii (Isis)	β Geminorum	- 16 44	" 19	750
December.				
Metapontum	β Geminorum (setting)	+ 29 38	Dec. 21	610
Locri	"	+ 29 40	" 21	610

Equinoctial Year.

March.				
Nike Apteros	Spica (setting)	+ 6 10	Mar. 17	1130
Iuho Lacinia (near Croton)	α Arietis	+ 7 27	" 28	1000
Paestum (Neptune)	Spica (setting)	+ 3 5	" 22	535
Gergenti (Hercules)	"	+ 2 30	" 30	470

September.

Rhamnus (Themis)	Spica	+ 6 0	Sept. 17	1092
Tegea (Minerva)	"	+ 5 51	" 18	1075
Syracuse (? Minerva)	"	+ 4 30	" 20	815
Athens (dedication unknown)	"	+ 4 17	" 23	780
Rhamnus (Nemesis)	"	+ 4 5	" 22	747
Bassæ (Apollo)	"	+ 3 57	" 22	728
Ephesus (Diana)	"	+ 3 57	" 25	715
Syracuse (Diana)	"	+ 2 22	" 26	450
Ephesus (Diana) (re-orientation)	"	—	Oct. 6	355

Special Orientations.

Thebes	γ Draconis	+ 54 28	Sept. 20	1160
The City of the Dragon (Cadmus, p. 830)				
Eleusis (Ceres)	Sirius rising at midnight	- 18 0	" 13	1400

Britain—Canaan.

Since we have traces of temple worship in Britain 1000 years before the building of Solomon's temple, it may be

¹ Westermarck in "Folk-lore." Vol. xxi., p. 27.

useful to see what common practices can be gathered from Semitic and British traditions. We have common to both :—

- (1) Worship in high places.
- (2) Setting up of stones.
- (3) Sacrifices with blood poured on the altar.
- (4) Fire worship of Baal or Bel.
- (5) Human beings passing through the fire.

The question arises, then, were not the circle builders Semites antedating the Aryans?

The Dolmen Builders.

Another matter of great interest is connected with the erection of dolmens in imitation of the caves first used for Semitic worship. The most philosophical study of this question I have seen¹ certainly suggests that much light may be expected from this source.

NORMAN LOCKYER.

THE SKELETON OF BRONTOSAURUS AND SKULL OF MOROSAURUS.

THE exploration of the American Jurassic by Cope and Marsh for remains of the Sauropoda practically began on an extended scale in 1877. It has been continued by these pioneers and their successors with some interruptions to the present time.

During this period a number of more or less complete skeletons have been found. The first was that of *Camarasaurus supremus*, a sauropod closely related to the *Morosaurus* of Marsh, found in the Jurassic of Colorado in 1877, and partially described by Cope. It was restored life-size by Ryder on large sheets of linen and exhibited, but never published. The skeleton is now being prepared for mounting in the American

the great ornaments of the Yale University Museum, in which it is preserved. In 1897 the American Museum party found the entire hind portion of the skeleton of a *Diplodocus* also in the rich region of the Como Bluffs. Two years later another skeleton of a *Diplodocus*, the best yet discovered, was secured by the Carnegie Museum expedition, and forms the chief basis of the great cast recently presented to the British Museum. In 1901 the Field Columbian Museum, of Chicago, secured another fine sauropod skeleton, the basis of the restoration by Dr. E. S. Riggs. It is termed *Apatosaurus*, a name which Dr. Riggs thinks preoccupies *Brontosaurus*.

In 1897 the American Museum expedition discovered the skeleton of the *Brontosaurus* or *Apatosaurus* represented in the accompanying photograph. It enjoys the distinction of being the first of the Sauropoda to be mounted from the original materials.

The field and museum work on this skeleton occupied the American Museum staff more or less continuously from 1897 to the spring of 1905. In 1898 and 1899 the excavation was carried on, and a little more than two-thirds of the entire skeleton was recovered. In the following year a few more vertebræ were found. The special features are the very large size of the animal, the absence of crushing of the bones, and the completeness of the ribs. The original parts are supplemented by bones and casts or models from other individuals. The chief parts entirely missing are the skull, which was restored partly from an imperfect skull of *Brontosaurus*, partly from that of the *Morosaurus* described below, the three anterior cervical vertebræ, the forearms of both sides from the shoulder down, which were restored from the Yale University specimen, the upper portions of the sacrum, the hind-limb of one side, and the terminal portion of the tail. The hind-limb and the tail were completed from

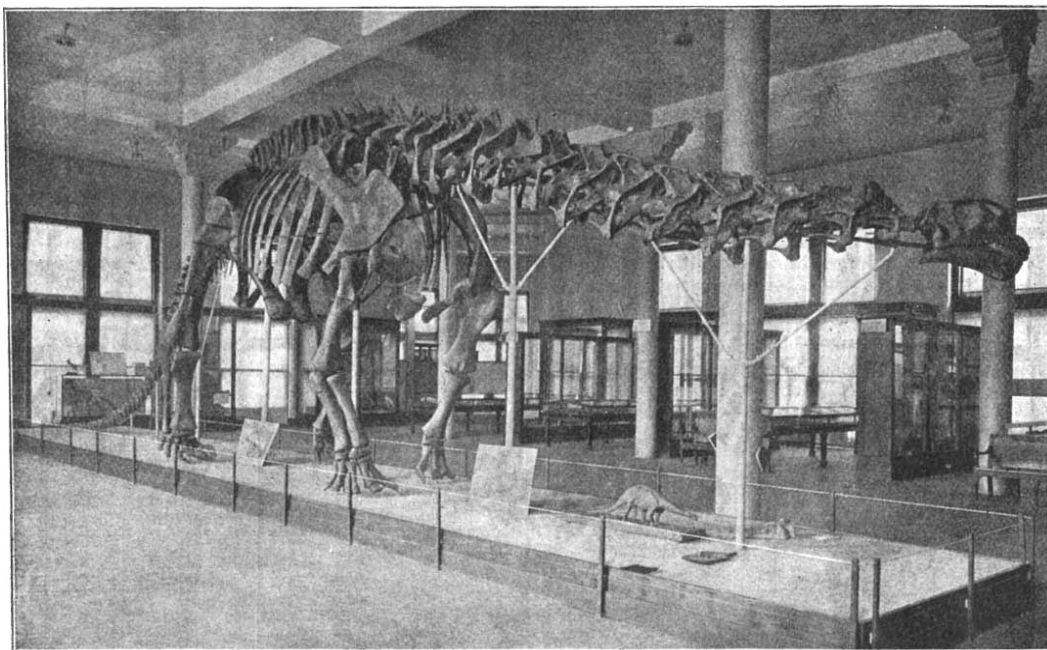


FIG. 1.—Skeleton of the *Brontosaurus excelsus* in the American Museum of Natural History, New York.

Museum of Natural History. The most complete skeleton known of *Brontosaurus* is the type of *B. excelsus*, Marsh, which was found in the Como Bluffs of Wyoming in 1879, and made the basis of Marsh's restoration of 1883, the first published. This beautiful specimen was unfortunately taken out before the method of removal from the matrix was as effective as it is now. It is, however, capable of being mounted, and will undoubtedly some day be one of

¹ "The Builders and the Antiquity of our Cornish Dolmens," by Rev. D. Gath Whitley (*Journal R.I. Cornwall*, No. 1.).

other individuals in the American Museum of Natural History.

The mounting represents the prolonged work of very difficult restoration and the solution of a number of quite new mechanical problems for the support of the immense weight of the fossil skeleton without making the iron and steel work too obtrusive. For this the head preparator, Mr. Adam Hermann, deserves chief credit. A number of new anatomical problems arose, especially as to the position and angulation of the fore-limbs. In this